C. Use Expanded Mortar

Begin using the expanded mortar according to the temperature requirements in the following table:

Temperature	Required Action
> 90 °F (> 32 °C)	Use mortar within 15 minutes after mixing.
70 °F to 90 °F (21 °C to 32 °C)	Use mortar within 30 minutes after mixing.
40 °F to 70 °F (4 °C to 21 °C)	Use mortar within 30 minutes after mixing.*
*Mortar may require additional aluminum powder to secure the required expansion. Additional amounts shall range from 0% at 70 °F (21 °C) to 100% at 40 °F (4 °C) in a straight-line proportion.	

D. Place Expanded Mortar

Place the expanded mortar as follows:

1. Expanded Mortar for Shear Keys
   a. Completely fill the shear key with mortar.
   b. Rod the mortar into a dense, homogenous mass.
   c. Float the mortar off flush with the surface of the precast decks.
   d. Moist cure the mortar continuously for a minimum of three days.
2. Placement Restrictions
   Do not place the mortar until after the entire bridge has been erected and all units are in final alignment.
   Do not allow traffic on the bridge decks until 5 days after the expanded mortar is placed.

506.3.06 Quality Acceptance

General Provisions 101 through 150.

506.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

506.4 Measurement

Expanded mortar is not measured for separate payment.

506.4.01 Limits

General Provisions 101 through 150.

506.5 Payment

Expanded mortar will be paid for at the Contract Price for concrete of the same Class as the concrete the mortar comes in contact with, and the Contractor shall include the cost of expanded mortar in the Contract Price for such concrete.

506.5.01 Adjustments

General Provisions 101 through 150.

Section 507—Prestressed Concrete Bridge Members

507.1 General Description

This work consists of furnishing prestressed concrete bridge members, complete in place, except as noted for piling in this Specification. The work includes all items and work necessary to complete the erection according to the Plans and Specifications. All prestressed concrete bridge member nominal lengths shown on the plans are horizontal dimensions. The contractor will be responsible for adjusting the lengths, as necessary, to account for the final erected position of the member. Fabricate the ends of all members to be vertical in the final erected position. Bearing assemblies need to be sloped to accommodate the erected position of the member.

507.1.01 Definitions

PSC: Prestressed concrete. Prestressed concrete may be designated "PSC" in Specifications and on Plans and other documents.

507.1.02 Related References

A. Standard Specifications

Section 109—Measurement and Payment

Section 500—Concrete Structures

Section 501—Steel Structures

Section 506—Expanded Mortar

Section 520—Piling

Section 865—Manufacture of Prestressed Concrete Bridge Members

B. Referenced Documents

General Provisions 101 through 150.

507.1.03 Submittals

A. Erection Drawings

Furnish erection drawings to the Department only when the units are not interchangeable with respect to the following:

- Transverse placement within a span
- Longitudinal reversal within a span

The drawings shall cover superstructure unit placement, including bearing components.

B. Shop Drawings

Submit shop drawings to the Department on standard Plan size 22 in x 36 in (550 mm x 900 mm) sheets showing complete beam details of the following:

- Nonprestressed reinforcement
- The method of retaining depressed strands in place
- Calculations for determining the strand elongation required to produce the specified pretensioning force
- Detensioning schedule
- Increased length of beam due to vertical alignment

507.2 Materials

All materials and manufacturing methods shall meet the requirements of Section 865. Reference is also made to the following:

Material	Section
Plain Steel Bars—Threaded Ends	853.2.05
Anchor Bolts	852.2.02
Bronze Bushings, Bearings, and Expansion Plates	857
Structural Steel	851.2.01
Elastomeric Pads	885.2.01
Plain Cotton Duck	881.2.01
Rubber Impregnated Cotton Duck	881.2.02
Paint	870

Substitute materials according to Subsection 865.2.01.B.3, "Substitution of Reinforcement" and Subsection 865.2.01.B.4, "Substitution of Strands."

507.2.01 Delivery, Storage, and Handling

A. General Delivery, Storage, and Handling

See Subsection 865.2.01, "Prestressed Concrete Bridge Members." Replace members damaged in handling or storage (at no additional expense to the Department) unless the Engineer determines that the member is usable.

B. Handling PSC Beams

In handling PSC beams, the Contractor shall ensure that beams maintain an upright position at all times and shall pick up beams at their pickup and support points (see Subsection 865.2.01.B.14.e, "Beams").

Disregarding this requirement could cause a bridge member to collapse.

507.3 Construction Requirements

507.3.01 Personnel

General Provisions 101 through 150.

507.3.02 Equipment

General Provisions 101 through 150.

507.3.03 Preparation

General Provisions 101 through 150.

507.3.04 Fabrication

See Subsection 865.2.01.B, "Fabrication."

507.3.05 Construction

A. Prepare Bearing Areas

Requirements for preparing steel bearing areas for PSC bridge members will be the same as those specified in Section 501 for Steel Structures, listed below. Other requirements are also noted below:

1. Steel on Concrete

   See Subsection 501.3.05.C.1, "Steel on Concrete."
2. Steel on Steel

   See Subsection 501.3.05.C.2, "Steel on Steel."
3. Steel on Self-Lubricating Bronze Plates

   See Subsection 501.3.05.C.3, Steel on Self-lubricating Bronze Plates."
4. Steel on Elastomeric Pads

   See Subsection 501.3.05.C.4, Steel on Elastomeric Pads."
5. Concrete on Concrete

   For concrete caps that PSC deck units will bear directly on, prepare bearing areas as follows:

   a. Finish the concrete caps with the Type IV—Floated Surface Finish specified in Subsection 500.3.05.AB.5, "Type IV—Floated Surface Finish."
   b. Cover the caps with asphalt-saturated felt as noted on the Plans.

      The Contractor may use felt of a lighter weight than that required on the Plans by increasing the number of layers proportionally.
6. Concrete on Timber Piling

   For treated timber piles that will support PSC caps, prepare bearing areas as follows:

   a. Cut off the pile heads.
   b. Have the piles field treated as specified in Subsection 520.3.05.J, "Repair and Treat Timber Piling."
   c. Protect the piles according to the applicable Specifications.

B. Erecting PSC Bridge Members

Erect bridge members according to the handling requirements in Subsection 507.2.01, "Delivery, Storage, and Handling," and as follows. Refer questions concerning structural requirements to the Engineer.

1. Beams

   Erect beams as follows:

   a. Erect beams in conformity with true longitudinal alignment and transverse placement as shown on the Plans or as directed by the Engineer.
   b. Ensure that the locations of fixed and expansion ends are as shown on the Plans or as directed by the Engineer.
   c. Do not weld in place structural steel bearing devices that will rest directly upon elastomeric pads while the devices are bearing against the pads.

2. Caps

   Erect PSC caps as follows:

   a. Align and grade the caps according to the Plans.
   b. Drift the caps to the timber pile heads according to the Plans.
   c. Proportion and mix expanding mortar according to Section 506.

      An approved mortar may be substituted for the expanded mortar as long as it is nonshrinking and commercially produced.
   d. Fill the drift pin holes with the expanding mortar according to Section 506.

3. Deck Units

   Erect PSC deck units (such as flat slabs and double tees) that will bear directly on caps so that all sections have a smooth, uniform bearing on the caps.

   a. **Aligning Deck Units.** Base the final deck unit alignments on the alignment of the traffic faces of the exterior section curbs.
   b. **Shimming.** If shimming is necessary to achieve proper riding surface, grade, or proper bearing uniformity, use steel shims and cut them to the following dimensions:
      - The same shape as the area to be shimmed
      - The thickness required to produce the required elevation and load distribution
   c. **Restrictions.** If the Engineer approves deck erection procedures that involve placing heavy lifting equipment on the decks, do not place the equipment until the cap drift pin mortar reaches 3000 psi (20 MPa).

4. Shear Keys

   Pour expanding mortar into shear keys between deck units as follows. The mortar shall meet the requirements of Section 506.

   a. Erect the entire bridge.
   b. Ensure that all units are in final alignment.
   c. Pour the mortar in the shear keys.
   d. Continuously moist cure the keys for at least three days.
   e. Keep traffic off the structure for at least 5 days.

5. Anchor Bolts and Nut Adjustment

   Place anchor bolts and adjust nuts according to Subsection 501.3.05.B.3, “Place Anchor Bolts and Adjust Nuts.”

6. Deck Grading

   Make sure PSC bridge members are 45 days old before grading the bridge deck for screeding.

C. Tighten Diaphragm Bars

Tighten diaphragm bars as follows:

1. Bring the diaphragm bar nuts to a snug fit against the beams.
2. Pour the diaphragm.
3. Allow the diaphragm concrete to age at least 5 days and reach at least 1,500 psi (10 MPa).
4. Tighten the nuts fully.
5. Cut off the excess bar length.
6. Place an approved grout in the recessed area provided for the bar’s nut and washer.

D. Concrete Finish

Use the Type III—Special Surface Coating Finish on PSC bridge members according to Subsection 500.3.05.AB and as follows:

- Beams -- Outside faces of certain exterior beams as indicated on the table of "Bridge Areas Bridge Areas Requiring a Type III Finish", in Subsection 500.3.05.AB.
- Deck Units -- Traffic and top faces of curbs on exterior units and the outside faces of certain exterior beams as specified in the table of "Bridge Areas Requiring a Type III Finish", in Subsection 500.3.05.AB.

507.3.06 Quality Acceptance

General Provisions 101 through 150.

507.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

507.4 Measurement

A. Prestressed Concrete Piling

Prestressed concrete piling shall be furnished, driven, and measured as a Pay Item under Section 520.

B. Beams

Accepted PSC beams will be measured in linear feet (meters) of each different type designation of beam.

Linear measurements will be the nominal lengths shown on the Plans.

Beam type designations will be shown on the Plans and will be related to any of the following:

- Cross sectional area and prestress tendons
- AASHTO type
- Special design

C. Deck Units

Accepted PSC deck units (such as flat slabs and double tees) will be measured for payment per span of each different nominal span length.

D. Caps

Accepted PSC caps will be measured for payment per each cap.

E. Prestressed Concrete Box Beams

PSC box beams will be measured for payment by the linear foot (meter) of beam of each vertical depth and by the number of strands in the beam.

507.4.01 Limits

No separate measurement will be made for any of the following:

- Painting, rubbing, anchor, and bearing components, as well as diaphragm bar assemblies on accepted PSC beams
- Individual deck units on which curb sections are located
- Material used in anchor components, shear key pours, and construction expansion joints
- Drifting components, anchor components, and asphalt-saturated felt for PSC caps
- Grouting between PSC box beams
- Furnishing and installation of diaphragm bar assemblies and anchor and bearing components

507.5 Payment

Payment will be made under:

Item No. 507	PSC Beam (Type)	Per linear foot (meter)
Item No. 507	Box Beam (Depth/Strands)	Per linear foot (meter)

Item No. 507	PSC Deck Units_____ foot (meter) span	Per span
Item No. 507	PSC Caps	Per each

A. Beams

The quantity of beams, determined as provided in Subsection 507.4, "Measurement", will be paid for at the Contract Price per linear foot (meter) of each different type designation, complete in place.

B. PSC Box Beams

The quantity of PSC box beams will be paid for at the Contract Unit Price bid per linear foot (meter). Payment shall be full compensation for furnishing and erecting the beam.

C. Deck Units

The quantity of deck units will be paid for at the Contract Price per span of each different nominal span length, complete in place.

D. Caps

The quantity of caps will be paid for at the Contract Price per each, complete in place.

E. Partial Payments

Material allowance payments for bridge beams will be determined and paid for according to the requirements of Subsection 109.07, "Partial Payments."

507.5.01 Adjustments

Upon completion of the erection in its final manner and position, 95 percent of the Contract Price will be paid on the next statement.

If there is no field rubbing or painting required, the 95 percent may be increased to 100 percent of the Contract Price. If this work is required, the remaining 5 percent will be included on the next statement after the Contractor satisfactorily completes the work.

Section 508—Asphalt Plank Bridge Floor

508.1 General Description

This work consists of laying asphalt plank slabs as a wearing surface on a prepared bridge deck.

508.1.01 Definitions

General Provisions 101 through 150.

508.1.02 Related References

A. Standard Specifications

Section 530—Waterproofing Fabrics

B. Referenced Documents

General Provisions 101 through 150.

508.1.03 Submittals

General Provisions 101 through 150.